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OPERATIONAL USE OF SMALL SATELLITES FOR THE CANADIAN ARMED FORCES

Abstract

The boundary between research and militarily operational space systems can be somewhat blurry, especially in terms of reliability, security and business model concerns and there are barriers that inhibit transitioning from one to the other. This paper will discuss this boundary and the accompanying barriers from the point of view of small space systems. This paper uses experiences from the development of Canada's NEOSSat and M3MSat microsatellites to inform this discussion.

With the increasing prevalence of small spacecraft technologies there is an associated push to use small satellites, microsatellites and nanosatellites for operational purposes. Defence Research and Development Canada (DRDC) has supported the development of microsatellite and nanosatellite technologies in Canada with an eye toward helping enable low cost space systems for the Canadian Armed Forces (CAF). For example, DRDC has helped develop and test new technologies by providing financial support to the Canadian Advanced Nanospace eXperiment (CanX) program, including the CanX-2, CanX-45 and CanX-7 missions. In addition DRDC, in partnership with the Canadian Space Agency (CSA), is a main customer for the M3MSat and NEOSSat missions.

The Department of National Defence's involvement with small space systems is not limited to the Research and Development sphere. Data from COM DEV's Nanosatellite Tracking Ships (NTS) spacecraft was used as part of security operations for the Vancouver Olympics, and the Sapphire satellite is providing operational space surveillance data to the U.S. Space Surveillance Network.

The low price point and shorter development times promised by the Microspace Philosophy are attractive for future missions, but key issues remain to be addressed before small space systems can be embraced for operational missions. These issues include the necessity for operational accreditation of systems before they can be used by the military. This accreditation includes requirements such as security, reliability, performance, mission length, compatibility with coalition partners, export controls, and disposal plans.

Other issues include understanding how best to perform space operations for the CAF, a topic which must include military doctrine. Examples of questions that need to be addressed include the difference between tactical and strategic assets, and the use of data from privately owned and/or operated sources as opposed to from government owned assets. Some of these concerns can ultimately force development schedules and greatly drive costs.

DRDC has confronted many of these issues during the planning and development of the NEOSSat and M3MSat missions. Insights from these and other related, projects will be discussed.